

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-69-101

YARDNEY ELECTRIC COMPANY
PAWCATUCK, CONNECTICUT
DECEMBER, 1973

I. TOXICITY DETERMINATION

It has been determined that ammonia, carbon monoxide and methylamine, gases potentially emitted from heated nylon, in the Lucite room are not toxic at concentrations measured during this evaluation. This determination is based on absence of these compounds in air samples and on the absence of medical symptomatology. A medical interview with the employee involved in the illness episode which prompted this investigation revealed that any relationship between heating of nylon and the illness incident was coincidental.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of the Determination Report are available upon request from the Hazard Evaluation Services Branch (NIOSH), U.S. Post Office Building, Room 508, 5th and Walnut Street, Cincinnati, Ohio 45202. Copies have been sent to:

- a) Yardney Electric Company - Pawcatuck, Connecticut
- b) Authorized Representative of Employees
- c) U.S. Department of Labor - Region I
- d) State of Connecticut Health Department
- e) NIOSH - Region I

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, U.S.C. 699 (2)(6) authorizes the Secretary of Health, Education and Welfare, following a request by any employee or authorized representative of employees, to determine whether any substance normally found in place of employment has toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees of the Yardney Electric Company regarding exposures to fumes generated from heating nylon screen frames. Fumes were alleged to be generated when heat from a soldering iron was applied to the nylon screens. This operation is located in the Machine Lucite room of the Yardney Electric Company, Pawcatuck, Connecticut.

IV. HEALTH HAZARD EVALUATION

A. Plant Process

This plant manufactures electric storage batteries of silver-zinc and silver-cadmium composition. These batteries are made to government specification for the space program and other technical applications. Nylon screen frames are used as dividers in certain types of batteries during the "in-plant" charging process. Nylon screen dividers are repaired when a large number of unservicable nylon screens have accumulated. Repair is accomplished by melting and fusing torn and broken frames together with the tip of a small soldering iron.

B. Evaluation Design

On September 5-7, 1973, an environmental/medical evaluation was conducted. Only one employee is directly exposed to nylon fumes released while repairing unservicable nylon frames. Several employees working in a room adjacent to work site evaluated were not included in this evaluation. The process allegedly emitting nylon fumes was relocated from its original site. A mock-up operation was simulated at the original work site for the benefit of our evaluation. Determinations for ammonia, methylamine and carbon monoxide were made via general room air samples.

C. Evaluation Method

Determinations for ammonia, methylamine and carbon monoxide were made with MSA indicator tubes. These air samples were collected approximately three-four inches from nylon screen and soldering iron.

The individual that alleged symptoms as a result of exposures nylon fumes was interviewed by a medical officer.

D. Evaluation Criteria

The occupational health standards promulgated by the U.S. Department of Labor (Federal Register, October 1972, Title 29, Chapter XVII, Subpart G, Table G-1) applicable to individual substances of this evaluation are as follows:

| <u>Substance</u> | <u>8-Hour Time-Weight-Average p.p.m.*</u> |
|------------------|---|
| Ammonia | 50 |
| Methylamine | 10 |
| Carbon monoxide | 50 |

* Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm Hg. pressure.

Occupational health standards for individual substances are established at levels designed to protect workers occupationally exposed on an 8-hour per day, 40 hours per week basis over a normal working life time.

E. Evaluation Results and Discussion

1. Environmental

Ammonia, methylamine and carbon monoxide are products normally found in thermal degradation of nylon exposed to elevated temperatures (900°F and higher). During the environmental survey it was indicated that soldering iron temperatures ranged from 650-700°F. While it was known that the soldering iron temperature was low, it was deemed necessary to determine presence or absence of ammonia, methylamine, and carbon monoxide.

All MSA indicating tubes showed zero concentration of contaminants in the air sampled. The zero concentration results confirmed the fact that the nylon is not heated to sufficient elevated temperatures to cause thermal degradation.

The generation of small amounts of smoke (plastic fumes) at point of contact between heating iron and nylon was noted. These fumes readily condense into particulate. The plastic fume has an unpleasant odor, however, it is readily dispersed into the large area surrounding the work site. Local ventilation is not available, but the volume of dilution room air is very large.

This nylon screen repair process was relocated to a work table near windows. Planned future modifications include local ventilation for the work table. The use of nylon screen dividers will be phased out and polyvinyl chloride (PVC) dividers will be substituted. Torn or broken PVC dividers are repaired or fused together with glue and solvent at room temperature.

2. Medical

While as many as seven employees worked in the large general area in which the repair takes place, none other than one individual was known to have developed symptoms as a result of this exposure. This individual had experienced only one episode of illness although he had performed this work approximately annually for the past 5-6 years.

The relation between this activity and the episode of illness the employee experienced is felt to be entirely coincidental.

Based upon environmental measurements and medical history obtained from exposed employees, large volume of dilutional air and total lack of known toxicity due to such emissions, it is judged this process, as performed, presents no health hazard.

V. REFERENCES

E. H. Coleman. When Plastic Burns, Product Engineering. Vol. 31
pp 40-41, Mid September 1960.

VI. AUTHORSHIP AND ACKNOWLEDGMENT

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